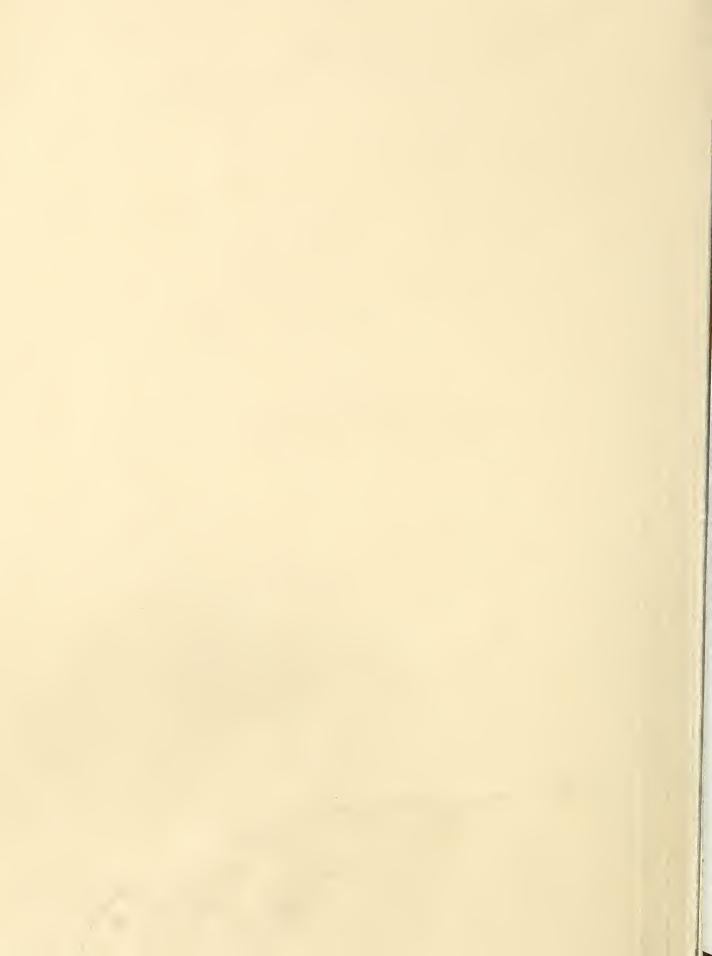**Historic, Archive Document**

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COOPERATING IN
The NATIONAL TURKEY
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U.S. DEPARTMENT OF AGRICULTURE

TURKEY

PERFORMANCE TESTS
1963

Report of Central Turkey Meat Production Tests and Statistical Analysis of Performance Records

Agricultural Research Service
UNITED STATES DEPARTMENT OF AGRICULTURE

FOREWORD

This publication includes reports of results from each of four turkey meat production tests conducted in 1963. The tests followed the procedures for central turkey meat production tests as provided in the National Turkey Improvement Plan. The detailed provisions for the tests are contained in USDA Miscellaneous Publication No. 739. Copies of this publication may be obtained from Official State Agencies for the National Turkey Improvement Plan or by writing directly to the Poultry Research Branch, AH Division, Agricultural Research Center, Beltsville, Maryland.

The results of the tests are reported by two methods. The performance data from each entry are shown in reports for each of the tests. The test results are also presented in a combined summary in which the results of all entries of each stock in all tests are combined by acceptable statistical procedures and reported by stocks.

CONTENTS

TESTING PROCEDURES

The procedures followed in each test were such as to provide equal environment for each entry but there were variations between tests in the methods used. Some of the variations between the tests are as follows:

Sampling: The same methods were used by all tests in obtaining the sample of poults for the entries. A representative of the entrant's Official State Agency selected a sample of eggs from a supply being used to produce poults of the stock entered. A prescribed method of randomization to provide a sample that was typical of the entire supply was followed. The eggs from all entrants in each test were set in the same incubators and, from the salable poults hatched, 100 were selected at random as the entry. The poults were then individually identified by wing bands.

In a few cases the egg sample did not produce enough salable poults and the entry started with less than 100 birds. However, since the performance data is collected on an individual bird basis, these variations gave no advantage or handicap to the affected entries in the final results.

Housing: In all tests, the poults from all entries were intermingled under the brooders. In Pennsylvania, the entries and sexes were separated at 6 weeks. In Minnesota, the entries were separated at 6 weeks of age. Each entry was then divided into two lots of equal numbers of toms and hens and maintained in replicate pens for the remainder of the test. In Nebraska, the entries were intermingled for the first 8 weeks. At 8 weeks of age, 25 toms and 25 hens from each entry were removed from the intermingled flock and maintained in segregated lots for the remainder of the test. In North Dakota, the entries were intermingled throughout the test, except that the Bronze entries were separated from the White entries.

In most tests the birds were confined to a house throughout the test, but in Nebraska, outside ranges were used after 8 weeks and in North Dakota, small pens adjacent to the house were provided.

Growing Periods: There were variations between tests in the length of the growing periods. The growing periods for hens ranged from 20 to 22 weeks and, for toms, from 25 to 26 weeks. The age of the birds at the time the test was terminated is indicated in each test report as the age for the final live weights.

Mortality: The mortality figures reported were based on the number of birds started and are accumulative for the periods indicated.

Live Weights: In each test the birds were weighed at various intermediate ages and again just before killing.

Eviscerated Weights: The eviscerated weights reported are the weights of the fully dressed carcasses and include the weight of neck and giblets.

In Pennsylvania, the carcasses were weighed immediately after dressing while in Minnesota they were placed in chill tanks for several hours before weighing. In the other tests, the carcasses remained in chill tanks overnight before weighing.

Body Measurements: There were also variations in the methods of making body measurements. The Minnesota test measured the live birds; Nebraska, the eviscerated birds; North Dakota and Pennsylvania tests measured at the New York dressed stage.

Grading: All grading is done by licensed graders and is based on USDA standards. However, the graders are instructed to disregard defects due to faulty handling during the dressing process, and there are undoubtedly between-test-variations in the way this deviation from normal grading is applied. The Nebraska test, for example, reported that bruises due to handling were the cause of many down-graded birds.

Defects: The specific defects, pendulous crop, roach back, leg weakness, and breast blisters, are recorded when observed at any time during the growing period or dressing process. However, only those defects that occur on birds that subsequently die or are graded other than Grade A are included in the test report.

Feed Conversion: Feed efficiency was measured by the tests in Minnesota, Nebraska, and Pennsylvania, and is reported as the pounds of feed required to produce a pound of live turkey from one day of age to time of slaughter. Feed consumption per entry was estimated for the initial period prior to the separation of the entries. The estimated feed consumption per entry during the initial period is based on the feed conversion ratio of the intermingled unit and the weight of the entry at the end of the period. During the remainder of the test, the weight of feed consumed was recorded by entries.

The test reports include feed conversion ratios as computed by two methods. The results reported under Method 1 reflect the pounds of feed required to produce a pound of marketable turkey. This method of computation is most commonly used by commercial growers and is more likely to reflect the probable overall economic returns. However, in this method, the ability of the stock to convert feed to meat may be confounded by mortality which occurred during the growing period. Method 2 tends to eliminate the influence of mortality by adding to the weight of the marketable turkeys the weight at time of death of the birds that died before the end of the test.

EVALUATION OF RESULTS

In the evaluation of the results, no direct comparison should be made between entries in different tests. Since differences in the performance of entries in different tests may be due to variations in testing procedures, direct comparisons of results reported in this summary should be made only between entries within a test. The fallacy of between tests comparisons may be illustrated by comparing the weights of entries in the Minnesota test with the weights for the same stocks in other tests. Such comparisons indicate that the relatively light weights of entries in the Minnesota test were due to environment rather than the inherent qualities of the stocks entered.

In comparing entries, the possibility of differences due to chance alone should be recognized. Obviously, small differences may be due to chance rather than to a genetic difference in the stocks tested. However, differences should not be ignored solely because they are small, nor should larger differences be accepted as signifying genetic differences because they are large.

It would be difficult to determine precisely what part of the difference between two entries was due to a true genetic difference in the stocks and that which was due to chance alone. Statistical procedures may be applied to test data which will indicate the probability of similar differences occurring in subsequent tests. The NTIP provides that one of these procedures, such as Duncan's Multiple Range Test, be applied to central turkey meat production tests and the results included in the national summary.

STATISTICAL SIGNIFICANCE OF DIFFERENCES

In applying Duncan's Multiple Range Test, the weights and measurements of each entry are compared to those of each-other entry within a test. The differences occurring are tested to determine whether they are statistically significant. The results of the statistical analysis are reported in a line chart which was prepared as follows: (1) For each test and for each trait measured, the entry numbers (shown with the entrant's name in the tables of results) were arranged with the entry having the largest weight or measurement on the left and in descending order to the smallest on the right. (2) A line (underscore) was then drawn under the first entry number and was extended under the number of each entry which did not differ significantly from the first entry. (3) This procedure was followed for each entry in the test.

In the completed chart, those entries whose numbers are underscored by a common line are not significantly different. For example, in the following illustration, entry No. 3 was the largest but not significantly different from entries 5 and 2. Entry 5 was not significantly different from 3, 2, 4, or 9 but was significantly larger than 10, 8, 7, 1 and 6. Entry 6 was the smallest but was not significantly smaller than 7 or 1.

```
Entry No.    3    5    2    4    9    10    8    7    1    6
             _____
                  _____
                            _____
                                            _____
```

Entrant: In the tables of results only the abbreviated names of the entrants and the State in which they are located are given. The complete names and addresses of all entrants appear on page 5.

Kind of Stock:

BBB	-	Broad Breasted Bronze
BBW	-	Broad Breasted White
BBA	-	Broad Breasted Auburn
BR	-	Breeder Replacement
SF	-	Supply Flock

Mating Procedure:

Nat.	-	Natural mating
Art.	-	Artificial insemination
Both	-	Natural mating, supplemented with artificial insemination

Feed Conversion: The figures reported represent the pounds of feed used to produce one pound of live turkey.

Method 1. Includes the weight of marketable turkeys only.
Method 2. Includes the weight of marketable turkeys plus the weight at time of death of birds that died during the growing period and the final weight of other unmarketable birds.

Eviscerated Weight: The weight of the fully dressed birds, including the neck and giblets.

Eviscerated Yield: The eviscerated weight expressed as a percentage of the live weight.

Body Measurements:

Breast Width	-	Measured at the widest point 1 3/4 inches above the keel.
Body Depth	-	Measured at the deepest point.
Keel Length	-	Measured as a straight line between the front and rear ends of the keel.

Grades: Percentage of birds in each grade is computed from the number of birds graded.

Defects: Percentage of birds with defects is computed from the number of birds started.

Name and Address of Entrant	Variety	Strain or Trade Name	Mating Procedure	Tests and Kind of Stock Entered			
				Minn.	Nebr.	N. Dak.	Penn.
Anderson Turkey Farm Belchertown, Massachusetts	BBB	Anderson	Art.				BR
Anderson Turkey Farm Belchertown, Massachusetts	BBW	Anderson Blockbuster	Art.	BR			BR
Anderson Turkey Hatchery, Inc., Frazee, Minnesota	BBW	Segar White	Both	SF			
Ephrata Turkey Farms, Inc., Ephrata, Pennsylvania	BBW	Ephrata Broad White	Art.				SF
Ephrata Turkey Farms, Inc., Ephrata, Pennsylvania	BBB	Marcum	Art.				SF
Gozzi Breeding Farms, Inc., Guilford, Connecticut	BBW	Gozzi 300	Both	SF			SF
Janssen Farm Hatcheries, Zeeland, Michigan	BBW	Janssen "Dutch Boy"	Both	SF		SF	SF
Janssen Farm Hatcheries, Zeeland, Michigan	BBB	Janssen "Dutch Boy"	Both	SF	SF	SF	SF
Jerome Turkey Hatchery, Inc., Barron, Wisconsin	BBW	Jerome Superline	Both	BR			
Land-O-Lakes Creameries, Inc., Valley City, North Dakota	BBB	Kimber KB 33	Both			SF	
Linesville Hatchery Linesville, Pennsylvania	BBW	Wilford 3C88	Both				SF
Meadowbrook Turkey Farms Sacramento, California	BBB	Meadowbrook MBX 100	Both	SF			BR
Morrow, J. M., Farms Carthage, Missouri	BBB	Morrow #4	Both		BR		
Nokota Hatchery Devils Lake, North Dakota	BBW	Nicholas	Nat.			SF	
Norbest Turkey Growers Assn., Salt Lake City, Utah	BBB	Hunter	Nat.		SF		
Pawling, Glen Middle Creek, Pennsylvania	BBW	Pawlings Premium	Art.				SF
Rose-A-Linda Turkey Farms Elverta, California	BBA	Rose-A-Linda	Art.				BR
Schultz, Fred & Son Box 246, Croton Falls, New York	BBW	Schultz Male Line	Art.				BR
Shearer, Robert K., R. D. 1, Reinholds, Pennsylvania	BBB	Shearer	Art.				BR
Washore Turkey Assn., Portland 14, Oregon	BBB	Washore "R" Strain	Both		BR		
Welkona Turkeys Kalona, Iowa	BBB	Tonnage Topper	Nat.		SF		
Wenzel, Harvey Garden Prairie, Illinois	BBB	Wenzel	Both		SF		
Williams Turkey Breeding Farms Oakdale, California	BBB	Williams	Both	SF	SF	SF	SF

MINNESOTA CENTRAL RANDOM SAMPLE TURKEY MEAT PRODUCTION TEST

ENTRANT	STRAIN OR TRADE NAME	COLOR	MORTALITY (%)			SEX	AVERAGE LIVE WEIGHT (lbs)						FEED CONVERSION	
			2 WEEKS	6 WEEKS	END OF TEST		6 WEEKS	12 WEEKS	18 WEEKS	20 WEEKS	21 WEEKS	25 WEEKS	METHOD 1	METHOD 2
1. Anderson Massachusetts	Blockbuster	W	2.8	2.8	7.8	Toms	2.65	9.1		17.6		24.6	3.34	3.29
						Hens	2.20	7.1	11.7	13.1	13.7			
2. Anderson Minnesota	Segar	W	0.9	0.9	1.9	Toms	2.45	8.3		16.5		22.5	3.40	3.39
						Hens	2.20	6.9	10.9	12.3	12.9			
3. Gozzi Connecticut	Gozzi 300	W	2.8	2.8	3.8	Toms	2.80	9.1		17.5		23.7	3.36	3.36
						Hens	2.35	7.1	11.3	12.7	13.3			
4. Janssen Michigan	Janssen "Dutch Boy"	W	3.8	3.8	3.8	Toms	2.40	8.1		15.6		21.6	3.43	3.43
						Hens	1.95	6.4	10.2	11.5	12.1			
5. Janssen Michigan	Janssen "Dutch Boy"	B	1.9	1.9	4.9	Toms	2.55	8.9		17.3		23.7	3.33	3.27
						Hens	2.30	7.3	11.3	12.6	13.2			
6. Jerome Wisconsin	Jerome Superline	W	1.9	1.9	2.9	Toms	2.80	9.2		17.0		23.7	3.50	3.50
						Hens	2.35	7.5	12.0	13.1	13.8			
7. Meadowbrook California	Meadowbrook MBX 100	B	0.9	0.9	1.9	Toms	2.65	8.7		16.4		22.8	3.38	3.35
						Hens	2.40	7.4	11.5	12.8	13.3			
8. Williams California	Williams	B	2.8	2.8	2.8	Toms	2.90	9.4		18.6		25.4	3.17	3.17
						Hens	2.45	7.8	12.5	13.8	14.5			
Average All Entries		B & W	2.2	2.2	3.7	Toms	2.65	8.8		17.0		23.5	3.36	3.35
						Hens	2.28	7.2	11.5	12.7	13.4			
Avg. Bronze Entries		B	1.9	1.9	3.2	Toms	2.70	9.0		17.4		24.0	3.29	3.26
						Hens	2.38	7.5	11.8	13.0	13.7			
Avg. White Entries		W	2.4	2.4	4.0	Toms	2.62	8.7		16.8		23.2	3.41	3.39
						Hens	2.21	7.0	11.2	12.5	13.2			

Statistical Significance of Differences Between Entries

Final Live Weight

Toms
Entry No.   8   1   6   3   5   7   2   4

Hens
Entry No.   8   6   1   3   7   5   2   4

Eviscerated Weight

Toms
Entry No.   8   1   6   3   5   7   2   4

Hens
Entry No.   8   1   6   7   5   3   2   4

Eviscerated Yield

Dressing percentage was reported by entries only, not by individual birds; therefore this method of analysis could not be applied.

MINNESOTA CENTRAL RANDOM SAMPLE TURKEY MEAT PRODUCTION TEST

EVISCERATED		BREAST WIDTH	BODY DEPTH	KEEL LENGTH	OVER-ALL QUALITY % U.S. GRADE			% U. S. GRADE A FOR:			PERCENT WITH:				ENTRANT
WEIGHT (lbs)	YEILD (%)	INCHES	INCHES	INCHES	A	B	C	FLESHING	FINISH	FREEDOM OF PIN-FEATHERS	PENDU-LOUS CROP	ROACH BACK	LEG WEAK-NESS	BREAST BLISTERS	
19.6	79.4	4.3	9.4	7.0	97.8	0.0	2.2	100.0	100.0	100.0	0.0	0.0	0.0	0.0	1.
10.7	78.2	3.5	7.4	5.5	98.0	0.0	2.0	100.0	100.0	100.0	2.0	0.0	0.0	0.0	Anderson
17.8	79.1	4.0	9.1	7.1	98.0	2.0	0.0	100.0	98.0	100.0	0.0	0.0	0.0	0.0	2.
10.1	78.1	3.4	7.3	5.6	98.0	2.0	0.0	98.0	100.0	100.0	0.0	0.0	0.0	0.0	Anderson
18.9	79.5	4.1	9.6	7.1	100.0	0.0	0.0	100.0	100.0	100.0	0.0	0.0	0.0	0.0	3.
10.5	78.4	3.6	7.5	5.7	100.0	0.0	0.0	100.0	100.0	100.0	0.0	0.0	0.0	0.0	Gozzi
16.9	78.2	4.0	9.0	6.8	98.0	0.0	2.0	100.0	100.0	100.0	2.0	0.0	0.0	0.0	4.
9.4	78.0	3.2	7.1	5.4	96.1	0.0	3.9	100.0	100.0	100.0	3.9	0.0	0.0	0.0	Janssen
18.8	79.3	4.1	9.1	7.2	94.1	3.9	2.0	100.0	98.0	100.0	2.0	0.0	0.0	0.0	5.
10.5	79.8	3.3	7.4	5.7	97.8	2.2	0.0	100.0	97.8	100.0	0.0	0.0	0.0	0.0	Janssen
18.9	79.7	4.0	9.3	7.1	98.0	2.0	0.0	100.0	100.0	100.0	0.0	2.0	0.0	0.0	6.
10.7	77.9	3.4	7.5	5.6	94.0	2.0	4.0	100.0	98.0	100.0	4.0	0.0	0.0	0.0	Jerome
18.5	80.8	3.9	9.1	7.3	98.2	1.8	0.0	100.0	100.0	98.2	0.0	0.0	0.0	0.0	7.
10.7	80.4	3.5	7.3	5.7	100.0	0.0	0.0	100.0	100.0	100.0	0.0	0.0	0.0	0.0	Meadowbrook
20.2	79.4	4.3	9.7	7.5	96.2	3.8	0.0	100.0	96.2	100.0	0.0	0.0	0.0	0.0	8.
11.3	77.8	3.5	7.4	5.8	97.9	0.0	2.1	100.0	100.0	100.0	0.0	0.0	0.0	0.0	Williams
18.7	79.4	4.1	9.3	7.1	97.5	1.7	0.8	100.0	99.0	99.8	0.5	0.0	0.0	0.0	Average All
10.5	78.6	3.4	7.4	5.6	97.7	0.8	1.5	99.8	99.5	100.0	1.2	0.3	0.0	0.0	Entries
19.2	79.8	4.1	9.3	7.3	96.2	3.2	0.6	100.0	98.1	99.4	0.7	0.0	0.0	0.0	Avg. Bronze
10.8	79.3	3.4	7.4	5.7	98.6	0.7	0.7	100.0	99.3	100.0	0.0	0.0	0.0	0.0	Entries
18.4	79.2	4.1	9.3	7.0	98.4	0.8	0.8	100.0	99.6	100.0	0.4	0.0	0.0	0.0	Avg. White
10.3	78.1	3.4	7.4	5.6	97.2	0.8	2.0	99.6	99.6	100.0	2.0	0.4	0.0	0.0	Entries

Statistical Significance of Differences Between Entries

Breast Width

Toms
Entry No.   8   1   3   5   4   6   2   7

Hens
Entry No.   3   8   7   1   6   2   5   4

Body Depth

Toms
Entry No.   8   3   1   6   5   7   2   4

Hens
Entry No.   6   3   8   1   5   2   7   4

Keel Length

Toms
Entry No.   8   7   5   6   3   2   1   4

Hens
Entry No.   8   7   3   5   6   2   1   4

ENTRANT	STRAIN OR TRADE NAME	COLOR	MORTALITY (%)			SEX	AVERAGE LIVE WEIGHT (lbs)						FEED CONVERSION	
			2 WEEKS	8 WEEKS	END OF TEST		8 WEEKS	16 WEEKS	20 WEEKS	22 WEEKS	WEEKS	26 WEEKS	METHOD 1	METHOD 2
1. Janssen Michigan	Janssen "Dutch Boy"	B	5.0	6.0	9.0	Toms Hens	4.27	15.7 12.0	22.0 16.0	25.0		32.4	3.43 3.29	
2. Morrow Missouri	Morrow #4	B	6.0	7.0	11.0	Toms Hens	4.14	15.3 11.2	21.1 15.0	24.2		29.5	3.40 3.47	
3. Norbest Utah	Hunter	B	16.0	21.0	27.0	Toms Hens	4.24	15.6 11.9	21.9 15.4	25.2		31.1	3.63 3.46	
4. Washore Oregon	Washore "R" Strain	B	5.0	6.0	8.0	Toms Hens	4.29	15.4 11.7	21.2 14.8	23.9		30.5	3.42 3.53	
5. Welkona Iowa	Welkona Tonnage Topper	B	7.0	12.0	21.0	Toms Hens	4.68	16.1 12.5	21.9 15.9	24.6		31.4	3.39 3.33	
6. Wenzel Illinois	Wenzel	B	7.0	10.0	14.0	Toms Hens	4.21	15.4 11.6	20.6 14.8	23.3		29.6	3.71 3.45	
7. Williams California	Williams	B	11.0	13.0	16.0	Toms Hens	4.79	16.2 12.5	21.8 16.1	25.8		32.1	3.54 3.44	
Average All Entries		B	8.1	10.7	15.1	Toms Hens	4.37	15.7 11.9	21.5 15.4	24.6		30.9	3.50 3.42	

Statistical Significance of Differences Between Entries

Final Live Weight

Toms
Entry No.   1   7   5   3   4   2   6

Hens
Entry No.   7   1   5   3   2   4   6

Eviscerated Weight

Toms
Entry No.   1   7   5   3   4   2   6

Hens
Entry No.   1   7   5   3   4   2   6

Eviscerated Yield

Toms
Entry No.   3   4   5   7   1   6   2

Hens
Entry No.   4   3   7   1   5   2   6

8

CENTRAL TURKEY MEAT PRODUCTION TEST OF NEBRASKA

EVISCERATED		BREAST WIDTH	BODY DEPTH	KEEL LENGTH	OVER-ALL QUALITY % U. S. GRADE			% U. S. GRADE A FOR:			PERCENT WITH:				ENTRANT
WEIGHT (lbs)	YEILD (%)	INCHES	INCHES	INCHES	A	B	C	FLESHING	FINISH	FREEDOM OF PIN-FEATHERS	PENDULOUS CROP	ROACH BACK	LEG WEAK-NESS	BREAST BLISTERS	
26.1	80.7	5.0	8.8	7.7	48.3	41.4	10.3								1.
12.9	80.2	3.6	6.5	5.9	50.0	30.8	19.2								Janssen
23.6	80.0	4.3	8.7	7.5	75.0	15.0	5.0								2.
12.0	79.5	4.5	6.5	5.9	36.7	33.3	30.0								Morrow
25.5	82.0	4.8	8.7	7.8	50.0	42.9	7.1	Data Not Reported	Data Not Reported	Data Not Reported	Data Not Reported	Data Not Reported	Data Not Reported	Data Not Reported	3.
12.4	80.4	4.4	6.5	5.9	62.5	25.0	12.5								Norbest
24.9	81.7	4.8	8.8	7.9	87.0	8.7	4.3								4.
12.0	80.7	4.4	6.5	5.9	40.9	31.8	27.3								Washore
25.6	81.5	4.3	9.1	8.0	65.4	26.9	7.7								5.
12.7	79.9	4.3	6.7	6.0	57.2	21.4	21.4								Welkona
23.8	80.3	4.2	8.9	7.8	70.0	13.3	16.7								6.
11.7	79.3	4.4	6.4	6.0	60.0	10.0	30.0								Wenzel
25.9	80.7	4.7	8.9	7.7	35.5	54.8	9.7								7.
12.8	80.4	4.5	6.5	5.9	41.7	37.5	20.8								Williams
25.1	81.0	4.6	8.8	7.8	61.6	29.0	8.7								Average All
12.4	80.1	4.3	6.5	5.9	49.9	27.1	23.0								Entries

Statistical Significance of Differences Between Entries

Breast Width

Toms
Entry No.   1   3   4   7   2   5   6

Hens
Entry No.   1   7   2   6   4   3   5

Body Depth

Toms
Entry No.   5   7   6   1   4   2   3

Hens
Entry No.   5   1   3   7   2   4   6

Keel Length

Toms
Entry No.   5   4   3   6   7   1   2

Hens
Entry No.   5   6   4   3   1   2   7

ENTRANT	STRAIN OR TRADE NAME	COLOR	MORTALITY (%)			SEX	AVERAGE LIVE WEIGHT (lbs)						FEED CONVERSION	
			2 WEEKS	8 WEEKS	END OF TEST		WEEKS	12 WEEKS	WEEKS	22 WEEKS	25 WEEKS	WEEKS	METHOD 1	METHOD 2
1. Janssen Michigan	Janssen "Dutch Boy"	W	1.0	3.0	5.0	Toms Hens		9.7 7.4		21.7 14.6	25.7			
2. Janssen Michigan	Janssen "Dutch Boy"	B	5.0	5.0	5.0	Toms Hens		10.4 8.3		25.6 17.7	30.0			
3. Land-O'Lakes North Dakota	Kimber KB 33	B	5.0	6.0	9.0	Toms Hens		9.8 7.8		23.3 15.9	27.8			
4. Nokota North Dakota	Nicholas	W	6.0	8.0	11.0	Toms Hens		10.7 8.3		23.6 16.0	27.3			
5. Williams California	Williams	B	9.0	10.0	16.0	Toms Hens		10.9 8.6		26.7 17.9	31.2			
Average All Entries		B & W	5.2	6.4	9.2	Toms Hens		10.3 8.1		24.2 16.4	28.4			
Avg. Bronze Entries		B	6.3	7.0	8.0	Toms Hens		10.4 8.2		25.2 17.2	29.7			
Avg. White Entries		W	3.5	5.5	10.0	Toms Hens		10.2 7.9		22.7 15.3	26.5			

Statistical Significance of Differences Between Entries

Final Live Weight

Toms
Entry No.　5　　　　　　　2　　　　　　3　　　　　　4　　　　　　1

Hens
Entry No.　5　　　　　2　　　　　4　　　　　3　　　　　1

Eviscerated Weight

Toms
Entry No.　5　　　　　　2　　　　　3　　　　　4　　　　　1

Hens
Entry No.　2　　　　　5　　　　　3　　　　　4　　　　　1

Eviscerated Yield

Toms
Entry No.　2　　　　　4　　　　　3　　　　　5　　　　　1

Hens
Entry No.　1　　　　　2　　　　　3　　　　　5　　　　　4

NORTH DAKOTA CENTRAL RANDOM SAMPLE TURKEY MEAT PRODUCTION TEST

EVISCERATED		BREAST WIDTH	BODY DEPTH	KEEL LENGTH	OVER–ALL QUALITY % U. S. GRADE			% U. S. GRADE A FOR:			PERCENT WITH:				ENTRANT
WEIGHT (lbs)	YEILD (%)	INCHES	INCHES	INCHES	A	B	C	FLESHING	FINISH	FREEDOM OF PIN-FEATHERS	PENDU-LOUS CROP	ROACH BACK	LEG WEAK-NESS	BREAST BLISTERS	
21. 3	82. 8	7. 5	9. 0	7. 1	100. 0	0. 0	0. 0	100. 0	100. 0	100. 0	0. 0	0. 0	0. 0	0. 0	1.
12. 1	82. 5	6. 1	7. 4	6. 3	94. 3	3. 8	1. 9	100. 0	100. 0	100. 0	0. 0	5. 7	0. 0	0. 0	Janssen
25. 0	83. 6	8. 3	9. 2	7. 6	96. 2	1. 9	1. 9	100. 0	100. 0	100. 0	0. 0	1. 9	0. 0	1. 9	2.
14. 6	82. 4	6. 7	7. 6	7. 0	94. 6	5. 4	0. 0	100. 0	97. 3	97. 3	0. 0	2. 7	0. 0	0. 0	Janssen
23. 2	83. 4	7. 8	9. 2	7. 5	95. 7	4. 3	0. 0	100. 0	100. 0	100. 0	0. 0	0. 0	0. 0	4. 3	3.
13. 0	82. 0	6. 2	7. 6	6. 7	90. 9	6. 8	2. 3	100. 0	100. 0	100. 0	0. 0	6. 8	0. 0	2. 3	Land O'Lakes
22. 8	83. 4	7. 5	9. 4	7. 4	94. 9	5. 1	0. 0	100. 0	100. 0	100. 0	0. 0	0. 0	0. 0	5. 1	4.
13. 0	81. 2	5. 9	7. 7	6. 7	100. 0	0. 0	0. 0	100. 0	100. 0	100. 0	0. 0	0. 0	0. 0	0. 0	Nokota
25. 9	83. 0	8. 3	8. 9	7. 7	96. 6	3. 4	0. 0	100. 0	100. 0	100. 0	0. 0	3. 4	0. 0	0. 0	5.
14. 6	81. 4	6. 4	7. 7	6. 8	97. 9	0. 0	2. 1	100. 0	100. 0	100. 0	0. 0	0. 0	0. 0	2. 1	Williams
23. 6	83. 2	7. 9	9. 1	7. 5	96. 7	2. 9	0. 4	100. 0	100. 0	100. 0	0. 0	1. 1	0. 0	2. 3	Average All
13. 5	81. 9	6. 3	7. 6	6. 7	95. 5	3. 2	1. 3	100. 0	99. 5	99. 5	0. 0	3. 0	0. 0	0. 9	Entries
24. 7	83. 3	8. 1	9. 1	7. 6	96. 2	3. 2	0. 6	100. 0	100. 0	100. 0	0. 0	1. 8	0. 0	2. 1	Avg. Bronze
14. 1	81. 9	6. 4	7. 6	6. 8	94. 5	4. 1	1. 4	100. 0	99. 1	99. 1	0. 0	3. 2	0. 0	1. 5	Entries
22. 1	83. 1	7. 5	9. 2	7. 3	97. 5	2. 5	0. 0	100. 0	100. 0	100. 0	0. 0	0. 0	0. 0	2. 6	Avg. White
12. 6	81. 9	6. 0	7. 6	6. 5	97. 2	1. 8	1. 0	100. 0	100. 0	100. 0	0. 0	2. 9	0. 0	0. 0	Entries

Statistical Significance of Differences Between Entries

Breast Width

Toms
Entry No.   5   2   3   4   1

Hens
Entry No.   2   5   3   1   4

Body Depth

Toms
Entry No.   4   5   3   2   1

Hens
Entry No.   5   4   3   2   1

Keel Length

Toms
Entry No.   5   2   3   4   1

Hens
Entry No.   2   5   4   3   1

ENTRANT	STRAIN OR TRADE NAME	COLOR	MORTALITY (%)			SEX	AVERAGE LIVE WEIGHT (lbs)						FEED CONVERSION	
			2 WEEKS	8 WEEKS	END OF TEST		6 WEEKS	WEEKS	12 WEEKS	WEEKS	22 WEEKS	25 WEEKS	METHOD 1	METHOD 2
1. Anderson Massachusetts	Anderson	B	4.2	5.0	9.8	Toms	2.5		11.4			32.3	3.56	3.49
						Hens	2.3		8.7		18.6		3.49	3.40
2. Anderson Massachusetts	Blockbuster	W	0.8	2.5	8.3	Toms	2.4		10.2			28.8	3.90	3.69
						Hens	2.1		8.0		16.4		3.57	3.47
3. Ephrata Pennsylvania	Ephrata Broad White	W	1.7	4.2	7.8	Toms	2.3		9.3			26.5	3.81	3.70
						Hens	1.9		7.2		14.2		3.48	3.44
4. Ephrata Pennsylvania	Marcum	B	0.0	2.5	4.5	Toms	2.1		9.5			26.9	3.52	3.49
						Hens	2.0		7.3		15.2		3.45	3.39
5. Gozzi Connecticut	Gozzi 300	W	0.8	0.8	3.8	Toms	2.4		9.9			26.8	3.90	3.86
						Hens	2.0		7.6		15.6		3.77	3.66
6. Janssen Michigan	Janssen "Dutch Boy"	B	0.8	1.6	4.5	Toms	2.4		10.7			29.3	3.57	3.47
						Hens	2.2		8.3		17.3		3.58	3.56
7. Janssen Michigan	Janssen "Dutch Boy"	W	0.8	2.5	5.3	Toms	2.3		9.6			27.6	3.68	3.65
						Hens	2.0		7.5		15.3		3.58	3.48
8. Linesville Pennsylvania	Wilford	W	1.7	2.5	4.5	Toms	2.3		9.1			24.7	3.83	3.78
						Hens	1.9		7.1		14.7		3.64	3.57
9. Meadowbrook California	Meadowbrook MBX 100	B	0.0	0.8	2.5	Toms	2.4		10.3			28.8	3.57	3.57
						Hens	2.2		8.1		16.0		3.79	3.75
10. Pawling Pennsylvania	Pawling's Premium	W	2.1	5.1	8.2	Toms	2.6		10.2			28.0	3.65	3.62
						Hens	2.1		7.9		16.0		3.60	3.50
11. Rose-A-Linda California	Rose-A-Linda	A	4.2	8.3	9.3	Toms	2.2		9.7			28.4	3.62	3.58
						Hens	2.1		7.8		16.8		3.35	3.35
12. Schultz New York	Schultz Male Line	B	0.8	1.6	5.5	Toms	2.4		9.8			28.4	3.55	3.44
						Hens	2.0		7.3		15.9		3.46	3.45
13. Shearer Pennsylvania	Shearer's	B	2.2	2.2	4.4	Toms	2.3		10.3			28.2	3.71	3.65
						Hens	2.1		7.8		16.1		3.42	3.42
14. Williams California	Williams	B	0.8	2.5	5.5	Toms	2.8		11.0			30.2	3.72	3.65
						Hens	2.2		8.6		17.2		3.67	3.55
Average All Entries		B & W	1.5	3.0	6.0	Toms	2.4		10.1			28.2	3.69	3.62
						Hens	2.1		7.8		16.1		3.56	3.50
Avg. Bronze Entries		B	1.7	3.1	5.8	Toms	2.4		10.3			29.1	3.60	3.54
						Hens	2.2		8.0		16.6		3.53	3.48
Avg. White Entries		W	1.2	2.9	6.3	Toms	2.4		9.7			27.1	3.80	3.72
						Hens	2.0		7.6		15.4		3.61	3.52

CENTRAL RANDOM SAMPLE TURKEY MEAT PRODUCTION TEST OF PENNSYLVANIA

EVISCERATED		BREAST WIDTH	BODY DEPTH	KEEL LENGTH	OVER-ALL QUALITY % U.S. GRADE			% U. S. GRADE A FOR:			PERCENT WITH:				ENTRANT
WEIGHT (lbs)	YEILD (%)	INCHES	INCHES	INCHES	A	B	C	FLESHING	FINISH	FREEDOM OF PIN-FEATHERS	PENDU-LOUS CROP	ROACH BACK	LEG WEAK-NESS	BREAST BLISTERS	
27. 1	82. 5	7. 2	9. 0	7. 6	95. 7	4. 3	0. 0	100. 0	95. 7	100. 0	0. 0	0. 0	2. 1	2. 1	1.
15. 3	82. 6	6. 5	7. 0	6. 4	95. 9	4. 1	0. 0	95. 9	100. 0	100. 0	0. 0	0. 0	2. 0	0. 0	Anderson
23. 8	82. 8	6. 5	8. 9	7. 4	100. 0	0. 0	0. 0	100. 0	100. 0	100. 0	0. 0	0. 0	0. 0	0. 0	2.
13. 1	80. 1	5. 5	7. 0	6. 1	100. 0	0. 0	0. 0	100. 0	100. 0	100. 0	0. 0	0. 0	0. 0	0. 0	Anderson
21. 9	82. 4	6. 4	8. 6	7. 2	100. 0	0. 0	0. 0	100. 0	100. 0	100. 0	0. 0	0. 0	0. 0	0. 0	3.
11. 3	79. 9	5. 2	6. 7	5. 8	100. 0	0. 0	0. 0	100. 0	100. 0	100. 0	0. 0	0. 0	0. 0	0. 0	Ephrata
22. 5	83. 5	6. 8	8. 2	7. 3	98. 0	2. 0	0. 0	100. 0	98. 0	100. 0	0. 0	0. 0	0. 0	0. 0	4.
12. 7	83. 3	6. 0	6. 7	6. 2	93. 9	6. 1	0. 0	100. 0	95. 9	98. 0	0. 0	0. 0	0. 0	0. 0	Ephrata
22. 0	82. 2	6. 0	8. 9	7. 5	95. 9	4. 1	0. 0	100. 0	95. 9	100. 0	0. 0	0. 0	0. 0	2. 0	5.
12. 5	79. 8	5. 3	7. 1	6. 1	100. 0	0. 0	0. 0	100. 0	100. 0	100. 0	0. 0	0. 0	0. 0	0. 0	Gozzi
24. 5	83. 6	6. 7	8. 9	7. 4	93. 7	6. 3	0. 0	97. 9	95. 8	100. 0	0. 0	0. 0	0. 0	0. 0	6.
14. 2	82. 1	5. 9	7. 1	6. 4	100. 0	0. 0	0. 0	100. 0	100. 0	100. 0	0. 0	0. 0	0. 0	0. 0	Janssen
22. 9	82. 8	6. 4	8. 8	7. 2	95. 9	4. 1	0. 0	100. 0	95. 9	100. 0	0. 0	0. 0	0. 0	0. 0	7.
12. 2	79. 5	5. 4	6. 8	6. 0	100. 0	0. 0	0. 0	100. 0	100. 0	100. 0	0. 0	0. 0	0. 0	0. 0	Janssen
20. 3	82. 1	6. 2	8. 4	7. 2	95. 9	4. 1	0. 0	100. 0	95. 9	100. 0	0. 0	0. 0	0. 0	0. 0	8.
11. 9	80. 8	5. 7	6. 9	6. 0	100. 0	0. 0	0. 0	100. 0	100. 0	100. 0	0. 0	0. 0	0. 0	0. 0	Linesville
24. 1	83. 5	6. 4	8. 9	7. 5	96. 0	4. 0	0. 0	100. 0	96. 0	100. 0	0. 0	0. 0	0. 0	0. 0	9.
13. 1	81. 9	5. 8	6. 9	6. 3	100. 0	0. 0	0. 0	100. 0	100. 0	100. 0	0. 0	0. 0	0. 0	0. 0	Meadowbrook
23. 2	83. 0	6. 4	8. 8	7. 2	98. 0	2. 0	0. 0	98. 0	100. 0	100. 0	0. 0	0. 0	0. 0	0. 0	10.
12. 8	80. 0	5. 3	6. 9	6. 1	100. 0	0. 0	0. 0	100. 0	100. 0	100. 0	0. 0	0. 0	0. 0	0. 0	Pawling
24. 0	84. 5	6. 7	8. 7	7. 4	95. 8	4. 2	0. 0	95. 8	100. 0	100. 0	0. 0	0. 0	0. 0	0. 0	11.
13. 1	78. 1	6. 1	6. 8	6. 2	96. 0	4. 0	0. 0	98. 0	98. 0	100. 0	0. 0	0. 0	0. 0	0. 0	Rose-A-Linda
23. 6	82. 9	6. 7	8. 7	7. 3	100. 0	0. 0	0. 0	100. 0	100. 0	100. 0	0. 0	0. 0	0. 0	0. 0	12.
12. 8	80. 5	5. 7	6. 9	6. 0	98. 0	2. 0	0. 0	100. 0	98. 0	100. 0	0. 0	0. 0	0. 0	0. 0	Schultz
24. 0	85. 1	7. 3	8. 5	7. 3	96. 9	3. 1	0. 0	96. 9	96. 9	100. 0	0. 0	0. 0	0. 0	0. 0	13.
13. 5	83. 6	6. 6	6. 8	6. 1	100. 0	0. 0	0. 0	100. 0	100. 0	100. 0	0. 0	0. 0	0. 0	0. 0	Shearer
25. 2	83. 6	6. 8	8. 8	7. 6	95. 9	4. 1	0. 0	100. 0	98. 0	98. 0	0. 0	0. 0	0. 0	4. 1	14.
13. 9	81. 3	5. 8	6. 9	6. 4	100. 0	0. 0	0. 0	100. 0	100. 0	100. 0	0. 0	0. 0	0. 0	0. 0	Williams
23. 5	83. 2	6. 6	8. 7	7. 4	97. 0	3. 0	0. 0	99. 2	97. 7	99. 9	0. 0	0. 0	0. 2	0. 6	Average All
13. 0	81. 0	5. 8	6. 9	6. 2	98. 8	1. 2	0. 0	99. 6	99. 4	99. 9	0. 0	0. 0	0. 1	0. 0	Entries
24. 4	83. 7	6. 8	8. 7	7. 4	96. 5	3. 5	0. 0	98. 8	97. 6	99. 8	0. 0	0. 0	0. 3	0. 8	Avg. Bronze
13. 6	81. 7	6. 1	6. 9	6. 3	98. 0	2. 0	0. 0	99. 2	99. 0	99. 8	0. 0	0. 0	0. 3	0. 0	Entries
22. 4	82. 6	6. 3	8. 7	7. 3	97. 6	2. 4	0. 0	99. 7	98. 0	100. 0	0. 0	0. 0	0. 0	0. 3	Avg. White
12. 3	80. 0	5. 4	6. 9	6. 0	100. 0	0. 0	0. 0	100. 0	100. 0	100. 0	0. 0	0. 0	0. 0	0. 0	Entries

Statistical Significance of Differences Between Entries

Final Live Weight

Toms
Entry No. 1 14 6 9 2 11 12 13 10 7 4 5 3 8

Hens
Entry No. 1 6 14 11 2 13 9 10 12 5 7 4 8 3

Eviscerated Weight

Toms
Entry No. 1 14 6 11 9 13 2 12 10 7 4 5 3 8

Hens
Entry No. 1 6 14 13 11 2 9 12 10 4 5 7 8 3

Eviscerated Yield

Toms
Entry No. 13 11 6 14 4 1 9 10 12 2 7 3 5 8

Hens
Entry No. 13 4 1 6 9 14 8 12 2 10 3 5 7 11

Breast Width

Toms
Entry No. 13 1 4 14 11 12 6 2 7 10 9 3 8 5

Hens
Entry No. 13 1 11 4 6 9 14 12 8 2 7 5 10 3

Body Depth

Toms
Entry No. 1 5 2 6 14 9 10 7 11 12 3 13 8 4

Hens
Entry No. 5 6 1 2 14 10 9 12 8 7 11 13 3 4

Keel Length

Toms
Entry No. 1 14 5 6 9 11 2 13 12 4 7 10 8 3

Hens
Entry No. 1 14 6 9 11 4 13 5 2 10 12 8 7 3

14

Minnesota Central Random Sample Turkey Meat Production Test
      (Supervisor: Robert E. Moehrle, State Office Building, St. Paul 1)

Central Turkey Meat Production Test of Nebraska
      (Supervisor: H. L. Wiegers, Poultry Husbandry Building, University of Nebraska, Lincoln 3)

North Dakota Central Random Sample Turkey Meat Production Test
      (Supervisor: David Dickens, Poultry Department, North Dakota Agricultural College,
         State College Station, Fargo)

Central Random Sample Turkey Meat Production Test of Pennsylvania
      (Supervisor: Charles W. Dorsey, Department of Agriculture, Harrisburg)

STOCKS ENTERED IN 1963 TURKEY MEAT PRODUCTION TESTS

Strain or Trade Name	Tests Entered				Strain or Trade Name	Tests Entered			
	Minn.	Nebr.	N. Dak.	Penna.		Minn.	Nebr.	N. Dak.	Penna.
Bronze					**White**				
Anderson				X	Anderson Blockbuster	X			X
Gibbon Hunter		X			Ephrata				X
Janssen "Dutch Boy"	X	X	X	X	Gozzi 300	X			X
Kimber KB 33			X		Janssen "Dutch Boy"	X		X	X
Marcum				X	Jerome Superline	X			
Meadowbrook MBX 100	X			X	Nicholas			X	
Morrow #4		X			Pawling Premium				X
Rose-A-Linda (Auburn)				X	Schultz Male Line				X
Shearer				X	Segar	X			
Washore "R" Strain		X			Wilford 3C88				X
Welkona Tonnage Topper		X							
Wenzel		X							
Williams	X	X	X	X					

INTRODUCTION

The primary objective of this summary is to present the test results in a manner that will support a sound evaluation of all stocks tested. The data presented are based on results reported by the 1963 Turkey Performance Tests and included on pages 20 to 23 of this publication.

All turkey meat production tests follow similar basic principles of operation. The entries in each test consist of poults hatched from random samples of eggs representing the stocks tested. All entries within a test are treated the same with respect to housing, feeding, management and disease control to avoid differences in performance due to differential treatment. However, there are differences between tests due to variations in climate and other environmental factors. Because of these differences, comparisons of the results for entries in different tests may be misleading.

The data presented in this summary are based on the results of all tests combined by stocks for each stock entered in one or more tests. The combined results, expressed as the Regressed Mean, are reported for each of the following traits: final live weight, feed conversion, eviscerated weight, eviscerated yield, breast width, body depth, keel length, and percent U. S. Grade A based on overall quality. The regressed mean for each stock and trait was determined by combining the results reported by all tests by accepted statistical procedures with adjustments for test differences. The regressed means may be used for valid comparisons of stocks entered in different tests. The regressed means and the accompanying least significant difference range for each trait provide a sound basis for comparing all stocks.

All stocks are listed in alphabetical order by breeder's name with regressed mean and LSD range for each trait. Each least significant difference (LSD) range was calculated, using the approximate standard error of the stock regressed means and the significant studentized range values for 10 at the 0.05 level of probability. It is essential, when comparing the performance of two stocks, to determine whether the regressed mean of one stock falls within the LSD range of the other stock. If it does, the odds are less than 19 in 20 that a real difference exists. If the regressed mean of a stock falls outside the LSD range of another stock, the odds are at least 19 in 20 that a real difference in performance between the two stocks does exist.

To avoid misinterpretation of the data, the following explanatory material should be reviewed carefully.

HOW TO TELL WHETHER DIFFERENCES ARE REAL

Errors of two kinds may influence the results of even the most carefully designed and operated tests. The first kind of possible error is the chance deviation or unavoidable "sampling error" which may be made when a small sample of eggs or poults represents an entry or stock. The other kind of possible error is due to uncontrolled or unknown environmental differences which may occur between entries within a test in spite of effort to treat each entry exactly alike. The differences between two entries in a single test, then, may be due to one or both of the above chance variations rather than to a real difference in the performance capabilities of the two stocks. The effect of the first kind of error may be materially reduced by making comparisons among stocks entered in several tests. If all stocks compared were entered in the same tests, the simple averages could be utilized without adjustment.

The data (regressed means) published in this summary are calculated from the results reported by several tests. It is unlikely, therefore, that the value of the regressed means for any stock, though perhaps entered in only one test, will be identical in value with the performance data published by the test officials. These differences may be attributed to adjustments for test differences, the number of tests entered and the number of entry replications per test.

The statistical treatment applied to these performance data is designed to reduce the influence of non-genetic variation. However, this cannot be accomplished perfectly. Consequently, estimates or predictions of performance cannot be made with absolute precision. Reliable predictions, within prescribed limitations, can be made as to whether a difference in the reported performance of two stocks represents a real difference in their performances. These predictions involve the use of the least significant difference (LSD) ranges which have been calculated for each trait analyzed.

As the name implies, the least significant difference range prescribes the approximate limits of difference which may be due to chance. Differences which exceed the LSD range probably are due to inherent difference between the stocks. The LSD range is a reliable guide for the appraisal of differences, but is not infallible. Appraisals of differences, based on the LSD range, may be wrong but the probability of such errors are considered in its computation.

As an aid to the evaluation of significant differences among stocks, the approximate LSD range at the 0.05 level of probability (19:1 odds) is given for each regressed mean in the alphabetical listing of all stocks. The LSD range of a stock represents the regressed mean plus or minus the LSD (less one unit of measurement) at the 0.05 level of probability (see Explanation of Terms).

A portion of a sample page of regressed means and LSD range is given below to facilitate the explanation of the use of the LSD range in appraising differences between stocks for the various traits.

Regressed Means and LSD Range by Stocks

Eviscerated Weight		Eviscerated Yield		Breast Width		Body Depth		Keel Length			
Regressed Mean	LSD* Range	Regressed Mean	LSD* Range	Regressed Mean	LSD* Range	Regressed Mean	LSD* Range	Regressed Mean	LSD* Range	Sex	Stock Code
21.1	19.6 22.6	82.3	81.5 83.1	5.1	4.7 5.5	8.5	8.4 8.6	7.1	7.0 7.2	Toms	1
12.1	11.3 12.9	80.9	80.1 81.7	4.8	4.5 5.1	6.8	6.7 6.9	5.8	5.7 5.9	Hens	
22.7	21.2 24.2	82.6	81.8 83.4	5.1	4.7 5.5	8.7	8.6 8.8	7.4	7.3 7.5	Toms	2
12.5	11.7 13.3	81.1	80.3 81.9	5.0	4.7 5.3	6.9	6.8 7.0	6.0	5.9 6.1	Hens	
20.4	18.9 21.9	81.2	80.4 82.0	4.8	4.4 5.2	8.6	8.5 8.7	6.9	6.8 7.0	Toms	3
11.1	10.3 11.9	80.4	79.6 81.2	4.4	4.1 4.7	6.7	6.6 6.8	5.6	5.5 5.7	Hens	

* If the regressed mean of another stock falls within this LSD range, these two stocks are not significantly different at the 5% level.

For the trait "Eviscerated Weight" for toms, we find that the regressed mean for Stock 1 is 21.1 pounds. This falls within the LSD range of Stock 3 (18.9 to 21.9) and consequently these two stocks are not significantly different at the 5% level for this trait. However, the regressed mean of Stock 1 does not fall within the LSD range of Stock 2 (21.2 to 24.2) and is thus significantly lighter in eviscerated weight than Stock 2.

Another example of the use of the LSD range can be shown by using the trait "Breast Width" for hens. The regressed mean for Stock 1 is 4.8 inches. This falls within the LSD range of Stock 2 (4.7 to 5.3); therefore these two stocks are not significantly different at the 5% level of probability for this trait. When comparing the regressed mean of Stock 1 (4.8 inches) with Stock 3, we can see that this regressed mean does not fall within the LSD range of Stock 3 (4.1 to 4.7) and consequently has a significantly broader breast than Stock 3.

EXPLANATION OF TERMS

Stock: A term used to identify the progeny of a specific breeding combination of turkeys. These breeding combinations may include pure strains, strain crosses, variety crosses, or combinations thereof.

Overall Mean: The average of the test adjusted means for all stocks. This estimates what the overall average would have been had all stocks been entered in all tests.

Range: The range represents the difference between the maximum and minimum performance among the 23 stocks, based on the regressed means.

Repeatability: This figure can vary from 0.00 to 1.00. The higher the figure, the greater is the likelihood of stocks ranking in the same order from one test to another.

Correlation Among Replicates: This correlation measures the repeatability among replicates of the same stock entered in the same test. It may vary from 0.00 to 1.00, but cannot be lower than the repeatability of stock performance between tests. The higher the correlation among replicates, the less need there is for replication of any stocks within tests. The difference between repeatability and the correlation among replicates is a measure of the importance of the test by stock interaction.

Test Adjustment Factor:	The amount by which a given test location was above or below the average for the three locations which reported data for all eight traits. These factors were determined on an intra-stock basis by least squares analysis.
Regressed Mean:	The test adjusted stock mean after weighting it according to the number of tests in which the stock was entered, the number of replicates per test, the repeatability, and the correlation among replicates.
Least Significant Difference:	The LSD prescribes the approximate limit of difference that may be due to chance. These values were computed from the approximate standard error of the regressed mean and the significant studentized range value for 10 means as given in Duncan's table for the 0.05 probability level.
LSD Range:	These figures represent the regressed mean of a stock plus and minus the LSD at the 5 percent level of probability (less one unit of measurement).

ANALYTICAL PROCEDURES

This summary presents analyzed performance data for the following traits: final live weight, feed conversion, eviscerated weight, eviscerated yield, breast width, body depth, keel length, and percent U. S. Grade A. All data reported on these traits for the 23 stocks entered in four random sample turkey meat production tests in 1963 were included in the combined analyses. These tests were conducted at four different locations in Minnesota, Nebraska, North Dakota and Pennsylvania. The data submitted for eight traits for Minnesota, Nebraska and Pennsylvania were used for determination of the test effects in the computation of the regressed means.

The performance data by pens were analyzed, using least-squares procedures to obtain the test adjustment factors, Table 1. Pooled estimates of variance components for 1961, 1962 and 1963 were used to obtain the repeatability estimates for each trait and the correlation among replicates, Table 2. The correlation among replicates is the correlation among pen means for the same stock within a test. In order that the results of all traits have a comparable environmental basis, the test adjustment factors were expressed as a plus or minus deviation from the average (see preceding paragraph). These factors were then used to adjust the simple stock average for test differences in order to obtain the test adjusted stock averages (least-squares stock means). The adjusted stock averages were then regressed toward the overall mean ($\hat{\mu}$), in order that differences in the number of tests entered and the number of replicates per entry might be considered.

$$\text{Regressed Mean} = \hat{\mu} + \frac{r/C}{1 + (k-1)x + \frac{(1-Ck)}{C}r} (\hat{s})$$

where: $\hat{\mu}$ = the average of the test adjusted stock means.

   r = repeatability.

   x = the correlation among replicates.

   k = the average number of replicates per test.

   C = the diagonal inverse element for that stock. The reciprocal of C, i.e., $\frac{1}{C}$, is equal to nk if the assumption is made that the adjustments for test effects are made without error; where n is the number of tests entered.

   $\hat{s}$ = the test adjusted stock average minus the overall mean $\hat{\mu}$.

18

Table No. 1
Adjustment Factors Used to Adjust for Test Differences

Traits		Minnesota	Nebraska	North Dakota	Pennsylvania
No. Stocks Tested		8	7	5	14
No. Pens		16	7	5	14
Final Live Weight	Toms	+ 4.12	- 3.31	- 1.12	- .82
	Hens	+ 1.58	- .41	- 1.32	- 1.17
Breast Width	Toms	+ .94	+ .45	- 2.84	- 1.40
	Hens	+ 1.05	+ .07	- 1.92	- 1.13
Body Depth	Toms	- .34	+ .21	- .18	+ .13
	Hens	- .43	+ .47	- .67	- .04
Keel Length	Toms	+ .24	- .18	- .09	- .07
	Hens	+ .25	+ .09	- .86	- .34
Eviscerated Weight	Toms	+ 3.72	- 2.49	- 1.54	- 1.23
	Hens	+ 1.41	- .34	- 1.29	- 1.07
Eviscerated Yield	Toms	+ 1.58	+ .45	- 2.23	- 2.04
	Hens	+ 1.10	- .20	- 2.29	- .90
Percent Grade A	Toms	-19.07	+36.06	-19.10	-16.99
	Hens	-16.01	+34.67	-15.20	-18.65
Feed Conversion *		+ .15	+ .03	-----	- .18

* Combined sexes

Table 2.
Overall Means, Minimum and Maximum Regressed Means,
Estimates of Repeatability and the Correlation Among Replicates

Trait	Overall Means		Regressed Means				Repeatability		Correlation Among Replicates	
			Minimum		Maximum					
	Hens	Toms	Hens	Toms	Hens	Toms	Hens	Toms	Hens	Toms
Final Live Weight	14.9	27.3	13.3	24.7	17.0	30.5	.841	.795	.871	.872
Breast Width	4.5	5.1	4.2	4.8	5.1	5.6	.649	.714	.847	.859
Body Depth	6.9	8.9	6.7	8.5	7.1	9.2	.745	.766	.745	.883
Keel Length	5.9	7.4	5.8	7.1	6.0	7.7	.590	.834	.628	.855
Eviscerated Weight	12.0	22.2	10.6	19.8	13.8	24.9	.838	.792	.889	.881
Eviscerated Yield	79.8	81.2	78.7	80.6	81.1	82.0	.487	.470	.487	.470
Percent Grade A	81.5	85.1	80.4	81.4	83.2	90.0	.168	.145	.168	.145
Feed Conversion*	3.40		3.36		3.51		.464		.464	

* Combined Sexes

19

Stock Code	Name and Address of Breeder	Variety	Strain or Trade Name	Sex	Final Live Weight		Feed Conversion**	
					Regressed Mean	LSD* Range	Regressed Mean	LSD* Range
38	Anderson Turkey Farm Belchertown, Massachusetts	BBB	Anderson	Toms	30.5	28.5 32.5	3.38	3.25 3.51
				Hens	17.0	15.9 18.1		
80	Anderson Turkey Farm Belchertown, Massachusetts	BBW	Anderson Blockbuster	Toms	28.4	26.4 30.4	3.48	3.35 3.61
				Hens	14.8	13.7 15.9		
239	Ephrata Turkey Farms, Inc. Ephrata, Pennsylvania	BBW	Ephrata	Toms	26.1	24.1 28.1	3.45	3.32 3.58
				Hens	13.3	12.2 14.4		
156	Gibbon Turkey Egg Pool Shelton, Nebraska	BBB	Hunter	Toms	27.7	25.7 29.7	3.48	3.35 3.61
				Hens	15.0	13.9 16.1		
123	Gozzi Breeding Farms, Inc. Guilford, Connecticut	BBW	Gozzi 300	Toms	27.2	25.2 29.2	3.51	3.38 3.64
				Hens	14.8	13.7 15.9		
110	Janssen Farms Hatcheries 121 E. Wash., Zeeland, Michigan	BBB	Janssen "Dutch Boy"	Toms	28.3	26.3 30.3	3.42	3.29 3.55
				Hens	15.2	14.1 16.3		
111	Janssen Farms Hatcheries 121 E. Wash., Zeeland, Michigan	BBW	Janssen "Dutch Boy"	Toms	25.8	23.8 27.8	3.47	3.34 3.60
				Hens	13.7	12.6 14.8		
244	Jerome Turkey Hatchery, Inc. 504 W. Div. Ave., Barron, Wisconsin	BBW	Jerome Superline	Toms	27.7	25.7 29.7	3.50	3.37 3.63
				Hens	15.3	14.2 16.4		
92	Kimber Turkey Breeding Farms 5695 E. Shields Ave., Fresno, Calif.	BBB	Kimber KB-33	Toms	26.8	24.8 28.8	----	---- ----
				Hens	14.6	13.5 15.7		
65	Lester P. Marcum 10501 S. Highway 99, Selma, Calif.	BBB	Marcum	Toms	26.4	24.4 28.4	3.36	3.23 3.49
				Hens	14.2	13.1 15.3		
62	Meadowbrook Turkey Farms R.D. 2, Box 810, Roseville, Calif.	BBB	Meadowbrook MBX-100	Toms	27.3	25.3 29.3	3.46	3.33 3.59
				Hens	14.9	13.8 16.0		
241	J. M. Morrow, Farms Box 697, Carthage, Missouri	BBB	Morrow #4	Toms	26.8	24.8 28.8	3.42	3.29 3.55
				Hens	16.8	15.7 17.9		

** Combined Sexes
* If the regressed mean of another stock falls within this LSD range, these two stocks are not significantly different at the 5% level.

Regressed Means and LSD Range by Stocks

Eviscerated Weight		Eviscerated Yield		Breast Width		Body Depth		Keel Length		Percent Grade A		
Regressed Mean	LSD* Range	Regressed Mean	LSD* Range	Regressed Mean	LSD* Range	Regressed Mean	LSD* Range	Regressed Mean	LSD* Range	Regressed Mean	LSD* Range	Stock Code
24.9	23.2 / 26.6	81.4	80.4 / 82.4	5.6	5.2 / 6.0	9.1	8.9 / 9.3	7.5	7.3 / 7.7	84.2	78.5 / 89.9	38
13.8	12.9 / 14.7	80.6	79.4 / 81.8	5.1	4.8 / 5.4	7.0	6.9 / 7.1	6.0	5.8 / 6.2	80.9	76.5 / 85.3	
23.0	21.3 / 24.7	81.0	80.0 / 82.0	5.2	4.8 / 5.6	9.0	8.8 / 9.2	7.3	7.1 / 7.5	84.1	78.4 / 89.8	80
11.7	10.8 / 12.6	79.5	78.3 / 80.7	4.5	4.2 / 4.8	7.0	6.9 / 7.1	5.8	5.6 / 6.0	81.5	77.1 / 85.9	
21.0	19.3 / 22.7	80.9	79.9 / 81.9	5.0	4.6 / 5.4	8.8	8.6 / 9.0	7.2	7.0 / 7.4	84.8	79.1 / 90.5	239
10.6	9.7 / 11.5	79.5	78.3 / 80.7	4.2	3.9 / 4.5	6.8	6.7 / 6.9	5.6	5.4 / 5.8	81.5	77.1 / 85.9	
22.8	21.1 / 24.5	81.7	80.7 / 82.7	5.2	4.8 / 5.6	8.9	8.7 / 9.1	7.6	7.4 / 7.8	85.2	79.5 / 90.9	156
12.0	11.1 / 12.9	80.0	78.8 / 81.2	4.5	4.2 / 4.8	7.0	6.9 / 7.1	6.0	5.8 / 6.2	83.2	78.8 / 87.6	
22.0	20.3 / 23.7	80.9	79.9 / 81.9	5.0	4.6 / 5.4	9.1	8.9 / 9.3	7.4	7.2 / 7.6	83.8	78.1 / 89.5	123
11.7	10.8 / 12.6	79.5	78.3 / 80.7	4.5	4.2 / 4.8	7.0	6.9 / 7.1	5.9	5.7 / 6.1	81.7	77.3 / 86.1	
23.0	21.3 / 24.7	81.2	80.2 / 82.2	5.2	4.8 / 5.6	8.9	8.7 / 9.1	7.5	7.3 / 7.7	82.5	76.8 / 88.2	110
12.2	11.3 / 13.1	80.4	79.2 / 81.6	4.6	4.3 / 4.9	7.0	6.9 / 7.1	6.0	5.8 / 6.2	81.2	76.8 / 85.6	
20.8	19.1 / 22.5	80.6	79.6 / 81.6	4.9	4.5 / 5.3	8.8	8.6 / 9.0	7.1	6.9 / 7.3	83.2	77.5 / 88.9	111
10.9	10.0 / 11.8	79.5	78.3 / 80.7	4.3	4.0 / 4.6	6.7	6.6 / 6.8	5.6	5.4 / 5.8	81.1	76.7 / 85.5	
22.6	20.9 / 24.3	81.3	80.3 / 82.3	5.0	4.6 / 5.4	9.0	8.8 / 9.2	7.3	7.1 / 7.5	84.2	78.5 / 89.9	244
12.1	11.2 / 13.0	79.5	78.3 / 80.7	4.5	4.2 / 4.8	7.0	6.9 / 7.1	5.9	5.7 / 6.1	81.0	76.6 / 85.4	
21.8	20.1 / 23.5	81.2	80.2 / 82.2	5.0	4.6 / 5.4	9.0	8.8 / 9.2	7.4	7.2 / 7.6	83.9	78.2 / 89.6	92
11.8	10.9 / 12.7	79.8	78.6 / 81.0	4.4	4.1 / 4.7	6.9	6.8 / 7.0	5.9	5.7 / 6.1	80.8	76.4 / 85.2	
21.5	19.8 / 23.2	81.4	80.4 / 82.4	5.5	5.1 / 5.9	8.5	8.3 / 8.7	7.2	7.0 / 7.4	84.5	78.8 / 90.2	65
11.6	10.7 / 12.5	80.9	79.7 / 82.1	4.8	4.5 / 5.1	6.7	6.6 / 6.8	5.8	5.6 / 6.0	80.7	76.3 / 85.1	
22.4	20.7 / 24.1	81.6	80.6 / 82.6	4.9	4.5 / 5.3	8.9	8.7 / 9.1	7.5	7.3 / 7.7	83.6	77.9 / 89.3	62
12.1	11.2 / 13.0	80.7	79.5 / 81.9	4.6	4.3 / 4.9	6.9	6.8 / 7.0	6.0	5.8 / 6.2	81.7	77.3 / 86.1	
21.6	19.9 / 23.3	80.9	79.9 / 81.9	4.9	4.5 / 5.3	8.9	8.7 / 9.1	7.5	7.3 / 7.7	88.4	82.7 / 94.1	241
13.8	12.9 / 14.7	79.6	78.4 / 80.8	4.5	4.2 / 4.8	6.9	6.8 / 7.0	5.9	5.7 / 6.1	80.4	76.0 / 84.8	

* If the regressed mean of another stock falls within this LSD range, these two stocks are not significantly different at the 5% level.

21

Stock Code	Name and Address of Breeder	Variety	Strain or Trade Name	Sex	Final Live Weight		Feed Conversion**	
					Regress-ed Mean	LSD * Range	Regress-ed Mean	LSD * Range
19	Nicholas Turkey Breeding Farms, Inc. 865 W. Napa St., Sonoma, California	BBW	Nicholas	Toms	26.5	24.5 28.5	----	---- ----
				Hens	14.7	13.6 15.8		
245	Glen Pawling Middle Creek, Pennsylvania	BBW	Pawling Premium	Toms	27.2	25.2 29.2	3.42	3.29 3.55
				Hens	14.8	13.7 15.9		
246	Rose-A-Linda Turkey Fr. & Hatchery 7842 Elmont Ave., Elverta, California	BBA	Rose-A-Linda	Toms	27.5	25.5 29.5	3.37	3.24 3.50
				Hens	15.5	14.4 16.6		
247	Schultz, Fred & Sons Croton Falls, New York	BBW	Schultz Male Line	Toms	27.5	25.5 29.5	3.37	3.24 3.50
				Hens	14.8	13.7 15.9		
22	Segars Turkey Breeding Ranch Box 1008, Turlock, California	BBW	Segars	Toms	26.8	24.8 28.8	3.46	3.33 3.59
				Hens	14.5	13.4 15.6		
66	Shearer, Robert K. R. D. 1, Reinholds, Pennsylvania	BBB	Shearer	Toms	27.4	25.4 29.4	3.41	3.28 3.54
				Hens	14.9	13.8 16.0		
243	Washore Turkey Assn. 920 S. E. Stark St., Portland 14, Ore.	BBB	Washore "R" Strain	Toms	27.2	25.2 29.2	3.43	3.30 3.56
				Hens	14.5	13.4´ 15.6		
242	Welkona Turkeys Kalona, Iowa	BBB	Tonnage Topper	Toms	27.9	25.9 29.9	3.40	3.27 3.53
				Hens	15.4	14.3 16.5		
121	Harvey Wenzel Garden Prairie, Illinois	BBB	Wenzel	Toms	26.6	24.6 28.6	3.50	3.37 3.63
				Hens	14.5	13.4 15.6		
196	Wilford Hatchery & Breeding Farm Elyria, Ohio	BBW	Wilford	Toms	24.7	22.7 26.7	3.47	3.34 3.60
				Hens	13.8	12.7 14.9		
107	Williams Hatchery Box 2, Oakdale, California	BBB	Williams	Toms	29.3	27.3 31.3	3.49	3.36 3.62
				Hens	16.0	14.9 17.1		

** Combined Sexes

* If the regressed mean of another stock falls within this LSD range, these two stocks are not significantly different at the 5% level.

Eviscerated Weight		Eviscerated Yield		Breast Width		Body Depth		Keel Length		Percent Grade A		
Regressed Mean	LSD* Range	Regressed Mean	LSD* Range	Regressed Mean	LSD* Range	Regressed Mean	LSD* Range	Regressed Mean	LSD* Range	Regressed Mean	LSD* Range	Stock Code
21.5	19.8 23.2	81.2	80.2 82.2	4.8	4.4 5.2	9.1	8.9 9.3	7.3	7.1 7.5	83.8	78.1 89.5	19
11.7	10.8 12.6	79.5	78.3 80.7	4.2	3.9 4.5	7.0	6.9 7.1	5.9	5.7 6.1	81.9	77.5 86.3	
22.0	20.3 23.7	81.1	80.1 82.1	5.0	4.6 5.4	8.9	8.7 9.1	7.2	7.0 7.4	84.5	78.8 90.2	245
11.7	10.8 12.6	79.5	78.3 80.7	4.3	4.0 4.6	6.9	6.8 7.0	5.8	5.6 6.0	81.5	77.1 85.9	
22.8	21.1 24.5	81.8	80.8 82.8	5.3	4.9 5.7	8.9	8.7 9.1	7.3	7.1 7.5	84.2	78.5 89.9	246
12.0	11.1 12.9	78.7	77.5 79.9	4.8	4.5 5.1	6.8	6.7 6.9	5.9	5.7 6.1	81.0	76.6 85.4	
22.3	20.6 24.0	81.1	80.1 82.1	5.2	4.8 5.6	8.8	8.6 9.0	7.2	7.0 7.4	84.8	79.1 90.5	247
11.8	10.9 12.7	79.8	78.6 81.0	4.6	4.3 4.9	6.8	6.7 6.9	5.8	5.6 6.0	81.2	76.8 85.6	
21.6	19.9 23.3	81.0	80.0 82.0	5.0	4.6 5.4	8.8	8.6 9.0	7.3	7.1 7.5	84.2	78.5 89.9	22
11.5	10.6 12.4	79.6	78.4 80.8	4.5	4.2 4.8	6.9	6.8 7.0	5.8	5.6 6.0	81.5	77.1 85.9	
22.6	20.9 24.3	82.0	81.0 83.0	5.6	5.2 6.0	8.7	8.5 8.9	7.3	7.1 7.5	84.4	78.7 90.1	ხ
12.3	11.4 13.2	81.1	79.9 82.3	5.1	4.8 5.4	6.8	6.7 6.9	5.8	5.6 6.0	81.5	77.1 85.9	
22.3	20.6 24.0	81.6	80.6 82.6	5.2	4.8 5.6	9.0	8.8 9.2	7.6	7.4 7.8	90.0	84.3 95.7	243
11.7	10.8 12.6	80.1	78.9 81.3	4.5	4.2 4.8	6.9	6.8 7.0	6.0	5.8 6.2	80.8	76.4 85.2	
22.8	21.1 24.5	81.5	80.5 82.5	4.9	4.5 5.3	9.2	9.0 9.4	7.7	7.5 7.9	87.2	81.5 92.9	242
12.3	11.4 13.2	79.8	78.6 81.0	4.5	4.2 4.8	7.1	7.0 7.2	6.0	5.8 6.2	82.6	78.2 87.0	
21.5	19.8 23.2	81.1	80.1 82.1	4.8	4.4 5.2	9.0	8.8 9.2	7.5	7.3 7.7	87.8	82.1 93.5	121
11.5	10.6 12.4	79.5	78.3 80.7	4.5	4.2 4.8	6.9	6.8 7.0	6.0	5.8 6.2	82.9	78.5 87.3	
19.8	18.1 21.5	80.7	79.7 81.7	4.9	4.5 5.3	8.7	8.5 8.9	7.2	7.0 7.4	84.2	78.5 89.9	196
11.0	10.1 11.9	79.9	78.7 81.1	4.5	4.2 4.8	6.8	6.7 6.9	5.8	5.6 6.0	81.5	77.1 85.9	
23.8	22.1 25.5	81.2	80.2 82.2	5.3	4.9 5.7	9.2	9.0 9.4	7.6	7.4 7.8	81.4	75.7 87.1	107
12.7	11.8 13.6	79.7	78.5 80.9	4.6	4.3 4.9	7.0	6.9 7.1	6.0	5.8 6.2	80.9	76.5 85.3	

* If the regressed mean of another stock falls within this LSD range, these two stocks are not significantly different at the 5% level.